DOCUMENT RESUME

ED 299 651 CS 506 447

AUTHOR Glasnapp, Pamela M.
TITLE The Learning and Recall of Unexpected Information in Social Schemas.
PUB DATE Nov 88
NOTE 47p.; Paper presented at the Annual Meeting of the Speech Communication Association (74th, New Orleans, LA, November 3-6, 1988).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS College Students; Communication Research; Higher Education; Information Sources; *Interpersonal Communication; Interpersonal Competence; *Recall (Psychology); Social Cognition
IDENTIFIERS Heider (F N); Social Roles

ABSTRACT

A study examined how people respond to violations of F. Heider's (1958) balance principle when learning patterns of sentiments among people in a group. Subjects, 90 students from introductory psychology and communication courses at the University of Kansas, participated in the experiment, and were randomly assigned to one of three schema conditions--transcendent, nontranscendent, and balanced. Fifty-four subjects participated in the one-week recall condition, while 36 subjects participated in the 15-minute recall condition. Subjects answered questions on four stories, then were interviewed and debriefed. Results indicated that when negative sentiments were paired with parent-child unit relations, subjects processed the sentences for a longer period and remembered the information less well; (2) that even in the nontranscendent condition, subjects sought for an explanation for unbalanced patterns and found it in the divorce schema and the religious differences schema (two of the stories); and (3) even though the apriori hypotheses were not fully confirmed, there was consistent evidence that the transcendent patterns were acquired and retained better than nontranscendent ones. Although the varying effects of the three conditions of the text variable produced significant interactions, therefore not supporting the apriori hypothesis, the notion of a transcendent explanation was strongly supported. In addition, results demonstrated that information that cannot be accounted for within a schema may not be recalled accurately, even when it receives greater processing time. These results were best accounted for with F. I. M. Craik and E. Tulving's notion of an integrated, coherent pattern produced by deep processing. (Fourteen tables, four stories, and 31 references are attached.) (RAE)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED299651

The Learning and Recall of Unexpected Information in Social Schemas

by

Pamela M. Glasnapp
Department of Communication
218 Bailey Hall
University of Southern Maine
Gorham, ME 04038

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Pamela Glasnapp

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Paper presented to the annual meeting of the Speech Communication Association, New Orleans, LA November, 1988

CS506447

BEST COPY AVAILABLE

The Learning and Recall of Unexpected Information in Social Schemas

A study was conducted to examine how people respond to violations of Heider's (1958) balance principle when learning patterns of sentiments among people in a group. Researchers (Crockett, 1985; Crockett & Kemper, 1983; Delia & Crockett, 1973; DeSoto, 1960; Hummert, 1986; Sentis and Burnstein, 1979) have argued that the balance principle functions as a social schema. Schemas, according to Sentis and Burnstein (1979) are:

> . . .conerent conceptual frameworks for representing relationships among social stimuli that guide the individual in organizing the social world. These cognitive structures are built up on the basis of experience with social reality and are active in the interpretation and comprehension of novel social events. (p 2200)

The logical properties of symmetry and transitivity, which characterize the balance principle, allow individuals to organize new information, make inferences about unknown relations, and retrieve social information efficiently. The symmetry principle assumes that for any relation if aRb, then bRa; in the case of sentiments, if A likes B, then B will like A. Transitivity occurs when aRb and bRc implies aRc; for sentiments, if A likes B and B likes C, then we can conclude that A likes C.

Although people often make use of the balance schema in processing patterns of interpersonal relations (Crockett, 1979, 1982; Picek, Sherman, & Shiffrin, 1975; Press, Crockett & Rosenkrantz, 1969) it is also true that they often encounter situations which do not fit the balanced principle. Heider (1958) points to easily recognizable examples of unbalanced situations, such as, "P hates O because he is so similar to O," and "He always hates people with whom he has to work." (p 180) What happens when a perceiver encounters social information that does not fit the expected pattern?

Little research has dealt directly with the processing of unbalanced structures. Most of the work on unbalanced structures has compared the learning and recall of such structures to that of balanced ones. When an unbalanced structure is not accompanied by any explanation, it is learned less rapidly and recalled less efficiently than is a balanced structure (Crockett, 1979; Delia and Crockett, 1973; DeSoto, 1960; Picek et al., 1975; Sentis and Burnstein, 1979). Sentis and Burnstein (1979) concluded that unbalanced structures are inefficiently stored as separate relations rather than as an integrated structure. That is, without a schema for organizing a group of relations, subjects must resort to learning those relations one at a time. A more effective encoding strategy might be possible if the perceiver were provided with an alternative account of the unexpected structure. Crockett and Kemper (1983) and Crockett (1986) propose that there are often transcendent explanations that will help the perceiver process unbalanced relational information by tapping a bit of world knowledge gleaned from the subject's life experiences. The term, "transcendent explanation" is drawn from a concept suggested by Abelson (1959) in a discussion of resolution of belief dilemmas. "The mechanism of transcendence is in a sense obverse to the mechanism of differentiation. Elements, instead of being split down, are built up and combined into larger units organized on a superordinate level." (p 346). That is, a single, coherent notion, such as a stereotyped explanation, might reconcile unexpected structures. For instance, "The Nerd" is an unflattering term that might provoke an immediate recognition for an unbalanced, asymmetric structure in which one person likes, yet is disliked by all others in a group. The present study will attempt to study transcendent explanations that tap stereotypical situations that subjects can recognize,

with the expectation that transcendent explanations will aid the subject in processing those unexpected structures.

It is hypothesized that stories which contain balanced relations will be learned faster and recalled with the fewest errors, stories which contain unbalanced relations embedded in a transcendent explanation will take somewhat longer to learn and will be recalled with slightly more errors, stories which contain unbalanced relations embedded in a nontranscendent explanation will take the longest to learn and will contain the most errors. It is expected that these differences should not occur until the first relation appears that violates the balanced schema.

METHOD

Overview

An experiment based on a 2 × 3 × 3 factorial design was conducted to test the hypotheses. Two of the factors were between-subjects factors: recall interval (immediate vs. one-week) and schema (transcendent, nontranscendent, balanced). Each schema level was also embedded in three different contexts, which added a within-subject factor, context. A 4-person pattern of sentiment relations was embedded in stories which were presented, one sentence at a time, over a computer terminal. Subjects controlled the rate of presentation and the length of time a given sentence was read. The times spent examining each item, both during acquisition and retrieval, and the accuracy of recall at retrieval were recorded by the computer automatically.

Development of Materials

Acquisition Paragraphs

It was necessary to develop three scenarios that could be varied so as to present the relations within four-persons groups in either a balanced pattern, an unbalanced pattern with a transcendent explanation, or an unbalanced pattern without a transcendent explanation.

Each scenario described the symmetric like or dislike sentiments between four of the six possible pairs of people. The balanced pattern represents a two-clique structure (Cartwright and Harary, 1956), in which the balanced group divides into two cliques, with only positive sentiments within each clique and negative sentiments between the two cliques. Hummert (1986) found evidence that subjects make use of the two-clique structure as a model for processing sentiment relations. Both the transcendent and nontranscendent conditions used an unbalanced pattern. The patterns were:

1. (unbalanced & balanced) A and B like each other.
2. (unbalanced & balanced) B and C dislike each other.
3. (unbalanced & balanced) C and D like each other.
4. (unbalanced) D and B like each other.
   (balanced) D and B dislike each other.

Note that the first three sentences are identical for both patterns, suggesting a balanced two-clique structure. The fourth relation verifies the two-clique structure for the balanced pattern, but creates a nonbalanceable structure for the unbalanced pattern.

Contexts. Scenarios were written to describe these patterns of sentiments in three different contexts. The criteria for selecting these contexts were (1) to choose situations that are commonplace and easily recognizable, yet which reasonably fit the pattern of sentiments listed above, (2) to write the paragraphs so that the format was comparable across scenarios, and (3) to provide a transcendent, a nontranscendent, and a balanced version of each context. The three contexts were selected: a conflictful divorce situation, a father-in-law who argues with his son-in-law about religious beliefs, and a group of students who clash while working together in a university senate. The format of the scenarios. Each paragraph consisted of eleven sentences. Because reading time was an important dependent variable, care was taken to see that sentences in the same ordinal position contained the same number of words in every version of a scenario. The first sentence contained the title of the story, for instance, "The title of this story is The Student Senate." The titles were written to give a general description of the situation, without specifying the nature of the sentiments among the characters.

The second sentence in each paragraph named the people in the story and briefly stated their roles to one another. For instance, in "The Student Senate," sentence two was "This story describes four students, Jerry, Scott, Chuck, and Mark, who have worked together in student government for several years." Sentences one and two were identical for the transcendent, nontranscendent, and balanced versions of each context, except for the names of the characters.

The third sentence of each story described the situation; in the transcendent condition, this sentence introduced the transcendent explanation.

The remaining eight sentences described the four pairs of sentiments listed in the patterns above. Two sentences described each pair: the first sentence stated the like or dislike sentiment, the second sentence elaborated on the first.

Except for the names of the characters, sentences 4, 6, and 8 were identical across the transcendent, nontranscendent, and balanced versions of each context. Sentences 5, 7, and 9 differed from one version to another. In the transcendent version, an explanation was given that fitted with the general explanation; this was especially true for the "B dislikes C" relation.

Sentence 10 was identical in the transcendent and nontranscendent versions; the balanced version was similar except it expressed a dislike sentiment.

Varying transcendence and nontranscendence. Manipulating the presence or absence of a transcendent explanation was difficult because the transcendent and nontranscendent scenarios contained the same pattern of sentiments embedded in the same contexts. In order to increase the contrast between the transcendent and nontranscendent conditions, the scenarios were written with two differences.

First, a summary sentence was added to the beginning of each scenario (sentence 3). Bransford and Johnson (1972) emphasize the importance of presenting a context prior to a paragraph for maximum effect in aiding comprehension and retention of the paragraph. In the transcendent version of each context, the third sentence summarized the crucial sentiments. The same sentence in the nontranscendent version gave only general information about the situation, without specifying the nature of the sentiments. For example, in "The Messy Divorce," sentence 3 in the transcendent version was "The

divorce between Mike and Ann produced many bitter feelings between them, although their daughter, Robin, has maintained a positive relationship with both her parents." Sentence 3 in the nontranscendent version was "The divorce between Susan and Alan produced many hardships in the family; such broken marriages have become increasingly common in modern American society."

Second, the nontranscendent versions were rewritten to contain unexpected sentiments between some of the characters; the transcendent version of a scenario retained the commonplace or expected relationships. For example, in "The Messy Divorce," the transcendent version includes a dislike sentiment between a woman (B) and her ex-husband (C), and a like sentiment between the woman (B) and her daughter (D). In order to provide the unexpected turn for the nontranscendent version, the identity of persons C and D were switched, so that the dislike sentiment occurred between the woman (B) and her daughter (C), and the like sentiment between the woman and her ex-husband (D).[1] In addition, these unexpected sentiments were followed by sentences that did not provide a reasonable explanation for the unexpected event.

The transcendent and nontranscendent versions of "Religious Differences" were constructed in a similar manner. In the transcendent version, the pious father-in-law dislikes his son-in-law, who often argues with him about religion. In the nontranscendent version, the pious father-in-law dislikes the daughter who married outside of the family religion, yet maintains a good

---

[1]In a subsequent study, subjects were asked to read paragraphs which summarized the information in sentences 1, 2, & 3 as described above. Subjects were then asked to infer 'like' or 'dislike' sentiments for each pair of persons in the story. The results for both the transcendent and nontranscendent versions confirmed the expected 'like' sentiments between parent and child, and the expected 'dislike' between the divorced couple, as assumed here.

relationship with her husband.[8]

A different strategy was necessary to create unexpected relations for the nontranscendent version of "The Student Senate." Sentence three was written to emphasize the positive accomplishments of the group, which should strengthen the assumption of unit relations among the students in the senate group. In view of the implied unit relationship, the dislike sentiment between persons B and C ought to be unexpected.[9] In addition, the second sentence in the "B dislikes C" pair of sentences (sentence 7) provides an unexpected description of a dislike relationship. (See Appendix A for the text of all scenarios.)

Construction of the balanced version. The balanced condition was added to the schema variable as a comparison to the acquisition and recall of the unbalanced pattern of sentiments. As described above, the balanced pattern was a two-clique model presented in the same order as the unbalanced pattern, and differing only on the last sentiment relation. The three contexts used for the two unbalanced patterns were adapted to the balanced pattern. Changing the last sentiment from "B likes D" to "B dislikes D" resulted in an unexpected sentiment for a parent-child relationship in "The Messy Divorce" and "Religious Differences." Subjects in a pilot study who were asked to

---

[8]In the study mentioned in the previous footnote, subjects in both the transcendent and nontranscendent condition who read summary paragraphs inferred a 'like' sentiment between the father and daughter, and a 'dislike' sentiment between father and son-in-law.

[9]In the study mentioned above, subjects who read the nontranscendent paragraph for "The Student Senate" inferred 'like' sentiments between all four persons in the story. Subjects who read the transcendent paragraph inferred a 'dislike' sentiment between B and C, and 'like' sentiments between all other persons.

evaluate the scenarios suggested that a dislike sentiment between a mother and child was more unexpected than was a dislike relation between a father and child. The central character in the transcendent and nontranscendent versions of "The Messy Divorce" was a woman. In order to avoid the highly unexpected dislike sentiment between a woman and her child as would occur in "The Messy Divorce," the characters in the balanced version were changed so that the central character in the story was a man. Thus, the dislike sentiments in the balanced version were between a man (B) and his ex-wife (C) and the man (B) and his son (D).

In addition to the nine experimental paragraphs, a sample story identical to the experimental stories in format, but following a different pattern of sentiments was written. This served as a practice trial in which subjects could learn the procedures for the experiment.

Pilot Studies Validating Experimental Materials

Two pilot studies were conducted to verify the difference between the transcendent and nontranscendent versions of each context. In the first study, after listening to an explanation of transcendence and nontranscendence, 18 subjects rated transcendent and nontranscendent versions of each of four different stories (one of which was later dropped.) For three of the stories, subjects were decidedly able to rate stories as either transcendent or nontranscendent. For "The Student Senate," however, both versions were seen as being transcendent. The nontranscendent version was rewritten, and another pilot was conducted with 32 subjects, each of whom rated transcendent or nontranscendent versions of the "The Messy Divorce," "Religious Differences," and "The Student Senate." Each subject read either two transcendent and one nontranscendent versions, or one transcendent and two

nontranscendent versions; the presentation of stories was counterbalanced to control for order effects. Using a simple chi square, there was a significant difference between the subjects' ratings of transcendent and nontranscendent conditions for all three contexts.*

Tests of Recall of Stimulus Materials

Recognition tests were prepared for each of the paragraphs. Each test consisted of twelve statements, one for each relationship among the four people in the story, with either "likes" or "dislikes" placed between the names. For example, one statement might be, "Ann dislikes Robin." Subjects responded to the statements with "true" or "false." True and false statements were of equal number in each test, and were randomly dispersed. Questions were randomly ordered, except that care was taken that two questions on the same pair of people did not appear in sequence. Eight of the twelve questions tested information that was specifically stated in the story; the remaining four tested information that was inferred but not stated directly. The four inferred questions were dispersed throughout the test. To avoid order effects, 12 versions of each of the 9 tests were made by rotating the questions. One version of a similar test was constructed for the practice trial story.

Subjects

Ninety subjects were recruited from introductory psychology and communication courses at The University of Kansas. Participation in the experiment fulfilled a course requirement for these students. Fifty-four

---

* The Messy Divorce χ^2 (1, N = 32) = 4.38, p<.05; Religious Differences χ^2 (1, N = 32) = 8.00, p<.005; The Student Senate χ^2 (1, N = 32) = 4.5, p<.05;

subjects, 28 males and 26 females, from introductory psychology courses participated in the one-week recall condition. Thirty-six subjects, 16 males and 20 females, from introductory communication courses participated in the 15-minute recall condition.

Subjects were randomly assigned to one of the three schema conditions (transcendent, nontranscendent, and balanced): 18 each in the one-week recall conditions, and 12 each in the immediate recall conditions. Care was taken to see that the proportion of males and females was roughly the same across these conditions.

During the analysis of the data, the researcher discovered that a typographical error had occurred on one of the stories during the first week of the data collection. Eight subjects in the one-week recall condition had completed the acquisition phase when this error was discovered and corrected. All the acquisition and recall data for those eight subjects were dropped from the analysis of the data; this dropped the total number of subjects in the transcendent condition from 30 to 22.

Procedures

Experimental Procedures

For the experiment, the 90 subjects were tested on an individual basis. Subjects were randomly assigned to one of the three schema conditions (transcendent, nontranscendent, balanced). The experiment was conducted in two phases: the acquisition and retrieval of the materials. For the subjects in the immediate-recall condition, both of these phases occurred within the same one-hour session. For the subjects in the one-week recall condition, the phases occurred in two 30-minute sessions that were exactly one week apart.

After brief oral instructions from the experimenter, subjects then read

written instructions for the procedure on the computer monitor. The instructions emphasized that the subject should study the paragraphs as long as necessary in order to learn the relations.

Practice story. In order to become familiar with the procedures, each subject completed the entire procedure with a practice story before reading and responding to the three experimental stories. The subject read the story one sentence at a time on the computer monitor. The subject controlled the rate of presentation of each sentence by pressing a button on the mouse. After all eleven sentences had been presented, the subject could choose to reread any of the sentences in the paragraph by selecting from a list of prompts for each sentence. The computer recorded in milliseconds the time spent reading each sentence initially, the number of times each sentence was reread, and the total time spent rereading each sentence.

After the subject indicated he or she had finished reading each story, eight true-false questions over the sentiments given in the paragraph were presented on the computer screen one at a time. The subject responded to each question by pressing a button labeled true or false on the mouse. For one-half of the subjects in each condition, the right button was labeled "true" and the left button was labeled "false"; for the other half of the subjects the reverse was true. The same buttons were labeled "true" and "false" for each subject for both the acquisition and retrieval phases.

The subject was able to control rate of presentation of each question by pressing a mouse button between each question in response to the statement, "Press when ready." The computer recorded (a) the response time to each question in milliseconds, (b) the response time between questions, (c) the subject's response (true or false) and (d) whether the subject's response

matched the correct response. The purpose of the true-false test immediately following the acquisition was to encourage subjects to learn the relations, as the retrieval phase was to be a surprise test of recognition at a later time.

In the practice session, immediately following the true/false test the subject was given feedback on his/her responses to the questions. That is, the computer monitor displayed the question, the correct response, the subject's response, and the response time. This immediate feedback allowed subjects to monitor their performance and underlined the importance of learning the sentiments during acquisition.

Experimental Stories. The procedure for the experimental stories was identical to that for the practice stories except that feedback was not given on the accuracy or latency of subjects' responses during acquisition. Upon completion of the acquisition phase, the subjects in the immediate-recall condition completed a 15 minute intervening distractor task that was unrelated to the experiment. The researcher asked subjects in the one-week condition to return one-week later.

For the retrieval phase, each subject answered four true-false tests, beginning with a test on the practice story and followed by tests on the three experimental stories, given in the same order as the stories were read in the acquisition phase. As described in the materials section above, each test consisted of 12 true-false questions, one for each ordered pair of characters in the four person group.

At the beginning of the retrieval phase, the researcher explained that they would be asked questions about the stories they had read earlier. In the oral instructions, the researcher stressed that the subjects should respond as quickly, yet as accurately as possible. In addition, the researcher told the

subjects to make their best guess on questions that they were unsure of, and to report to her if they accidentally pressed the wrong button in response to a question. The title of the story and the names of the characters appeared as a prompt at the beginning of each test.

After the subjects answered questions on all four stories, they were interviewed and debriefed. The researcher asked the subjects to describe what they remembered about each story, and what methods they used to remember the information. In addition, they were given a summary of the purpose of the experiment.

Results

Overview: Results reported here are based on the acquisition reading times for the initial sentence of each relational pair of sentences (i.e., sentences 4, 6, 8 and 10) and on the number of correct responses on each sentiment relation during recall. Individual analyses of "The Messy Divorce" and "Religious Differences" strongly supported the notion of transcendent explanations. For "The Student Senate," the reading times were significantly longer than for the other two stories, the reading time for each schema condition did not significantly differ from each other, and the error rates on recall were greater. In addition to these results and subject comments during debriefing, it is likely that this context did not represent a transcendent explanation. For these reasons, the results for "The Student Senate" will not be discussed here in detail. Tables listing the acquisition times and recall responses for "The Student Senate" are given in the appendix.

The differences between "The Student Senate" and the other two contexts resulted in strong interactions with the context variable on MANOVA procedures

for both acquisition and recall variables (See Appendix for MANOVA tables). As the purpose of this paper is to review the processing of unexpected schematic information, only the results from "The Messy Divorce" and "Religious Differences" will be presented here. A more complete discussion of all of the statistical results has been given elsewhere (Glasnapp, 1988).

Acquisition measures

Analysis of Initial Reading Times for "The Messy Divorce." A repeated measures multivariate analysis of variance was used to test the differences among acquisition times. The dependent variables were the initial reading times for sentences 4, 6, 8, and 10 of each story. As described previously, these sentences were the first of each pair of sentences that described each relation.

Schema (transcendent, non-transcendent, and balanced) was a between-subjects variable for this analysis. Sentence (4, 6, 8, 10) was a within-subjects variable. In MANOVA results for "The Messy Divorce," a Schema X Sentence interaction was significant (F [6,156] = 5.024, p (.0005) as were main effects for schema (F [2,79] = 4.30, p (.017) and sentence (F [3,77] = 3.377, p (.023). (See Appendix for MANOVA tables.) Table 1 lists the means for the initial reading times. These results support the hypothesis: both the balanced and transcendent schemas produced faster reading times than the nontranscendent. In addition, the transcendent schema had shorter reading times than the balanced one, contrary to the hypothesis. As may be seen, the reading times for the first three relations were nearly identical for all three scenarios. However, for the fourth sentence, reading time declined significantly for the transcendent scenario and declined nonsignificantly for the balanced one, but increased significantly for the nontranscendent

scenario.

Table 1

"The Messy Divorce"
Initial Reading Times*

	Sentence				
Schema	4	6	8	10	M
Trans	8.16_{aA}	8.26_{ab}	8.22_{ac}	7.87_{b}	8.13
Non	8.14_{aA}	8.37_{abB}	8.22_{ac}	8.60_{b}	8.33
Bal	8.16_{A}	8.29_{B}	8.29_{C}	8.05_{D}	8.20

* Log_n scores given in milliseconds.

Note. Means across the rows with the same lower case subscript do not differ significantly; means down the columns with the same upper case subscript do not differ significantly; HSD (237) = .345, $p < .05$.

The content of the sentences may offer an explanation for the unexpectedly long reading time on the fourth relation in the balanced story. Sentence 10 in the balanced version describes a negative sentiment between a father and his son. While the dislike sentiment completes the balanced, two-clique model, in this case it violates the unit relation between a parent and child. Hastie (1981) suggested that people study schema-discrepant information longer than schema-consistent information, which has been verified by other researchers (Stern, Marrs, Millar, Cole, 1984; Belmore, 1987). Therefore, it is probable that subjects studied the D-B relation in the balanced version longer because it violated the unit relation.

Analysis of reading times for "Religious Differences." MANOVA results of the initial reading times for sentences 4, 6, 8 and 10 produced a Schema X Sentence interaction (F [6,156] = 3.342, $p < .004$) and main effects for schema

(F [2,79] = 3.91, p < .024) and sentence (F [3,77] = 9.67, p <.0005). Table 2 presents the means for this analysis. As may be seen in Table 2, in all three conditions the slope of the reading times for the first three relations was generally downward, though there was a slight rise in reading times for sentence 6 in the nontranscendent condition. As expected, in the transcendent condition the slight downward trend continued for sentence 10. Contrary to expectations, the reading times for sentence 10 in the balanced condition increased significantly. As in "The Messy Divorce," the sentiment described in sentence 10 is a dislike sentiment between a parent and child, and therefore violates the expectations of a unit relation.

Table 2

"Religious Differences"

Initial Reading Times[a]

	Sentence				
Schema	4	6	8	10	M
Trans	8.24_{aA}	8.19_{aB}	8.08_{aC}	8.10_{a}	8.15
Non	8.38_{bA}	8.44_{bB}	8.01_{c}	8.47_{bD}	8.33
Bal	8.31_{cA}	8.26_{cB}	8.16_{cC}	8.41_{cD}	8.29

[a]Log_n of reading times in milliseconds.

Note: Means across the rows with the same lower case subscripts do not differ significantly; means down the columns with the same upper case subscripts do not differ significantly: HSD (237) = .31, p <.05.

Recall measures

Recall of Specific Relations. A separate repeated measures MANOVA for "The Messy Divorce" and "Religious Differences" will permit a detailed

analysis of the correct responses. For each procedure, the proportions of correct responses on each of the eight given questions were the dependent variables; schema and time of recall were between-subjects variables, and question (A-B, B-A, B-C, C-B, C-D, D-C, D-B, B-D) was a within-subjects variable. The eight levels of the question variable represent two questions for each of the four symmetric relationships.

Analysis of correct responses for "The Messy Divorce." This analysis produced a significant Schema X Question interaction (F [14,142] = 2.69, p <.002) and a main effect for question (F [7,70] = 3.59, p <.002). Table 3 reports the proportions on which these results are based. The columns of this matrix present the proportion correct for each of the eight questions; the rows present the proportion correct for the immediate and one-week recall conditions nested within the three schema conditions, transcendent, nontranscendent, and balanced. The last two columns in the matrix show the number of subjects in each row, and the point at which proportions for that row may be considered to be higher than would be expected by chance.

Table 3

"The Messy Divorce"
Proportion of Correct Responses

Schema	Questions on Given Relations								n	p(.05
	A-B	B-A	B-C	C-B	C-D	D-C	D-B	B-D		
Trans										
1-Wk	.90	.80	.80	.80	.90	1.00	1.00	1.00	10	.76
Immed	.92	.92	.83	.80	1.00	1.00	1.00	1.00	12	.74
Nontr										
1-Wk	.94	.89	*.44	.72	.72	.83	.83	.89	18	.69
Immed	1.00	.91	*.67	.83	.92	.92	.83	.92	12	.74
Bal										
1-Wk	.94	.83	.72	*.67	.83	.83	.89	*.50	18	.69
Immed	.92	.92	.92	1.00	.92	.92	1.00	*.58	12	.74

*Denotes proportions that are not greater than could be expected due to chance.

Note that for the transcendent scenario, in both the immediate and the one-week conditions, 80% or more of the subjects gave the correct response to each question. None of the differences between cells was significant in this condition.

For the nontranscendent scenario, in contrast, a smaller proportion of subjects recalled the B-C ("mother dislikes daughter") relation than the rest, especially in the one-week condition when only 8 of 18 subjects made the correct response. Subjects in the nontranscendent condition spent more time processing this relation than did the subjects in the transcendent and balanced condition; in spite of that, their recall was poor.[9] In contrast, 72

[9]The contrast between schema conditions on this relation (B-C) is even more pronounced on the total relation reading times (sentences 6 + 7). The nontranscendent $\underline{M}$ = 9.27; the transcendent $\underline{M}$ = 8.9, and the balanced $\underline{M}$ = 8.9.

percent of the one-week recall subjects and 83 percent of the immediate-recall subjects correctly answered the symmetric sentiment, C dislikes B, ("daughter dislikes mother"). This suggests that, without a transcendent explanation, the B-C relation is counter-schematic.

Finally, in the balanced scenario, in both the immediate and the one-week condition, barely half of the subjects recalled the B-D relation. Again, subjects spent an unusual amount of time processing this relation at acquisition, but recalled it at about chance levels. Recall that it described a dislike sentiment between a father and son. Again, the symmetric counterpart to this relation, a negative sentiment from child to parent, produced proportions of correct responses that were well above what could be expected due to random guessing. As the sentence pairs in the scenarios described the symmetric sentiments concurrently, it appears that subjects find it more understandable for a child to dislike a parent than for a parent to dislike the child.

Note also that the proportion of correct responses for "C dislikes B" in the one-week condition is .67, which is significantly lower than the 1.00 for the same question in the immediate recall condition. As this relationship was between a man and his ex-wife, a dislike sentiment was not incongruent with a unit relation, and the acquisition times were as expected for that relation (sentences 6 and 7), so it is not clear why the proportion of correct responses on this particular question was low.

Analysis of correct responses on "Religious Differences." The MANOVA on "Religious Differences" produced a main effect for time of recall (F [1,76] = 5.15, p < .026), and a Schema X Time of Recall X Question interaction that approached significance (p < .059). Table 4 lists the proportions of correct

responses for "Religious Differences."

Table 4

"Religious Differences"
Proportion of Correct Responses

Schema	Questions on Given Relations								n	p(.05
	A-B	B-A	B-C	C-B	C-D	D-C	D-B	B-D		
Trans										
1-Wk	1.00	1.00	.90	.80	1.00	.90	*.70	.90	10	.76
Immed	.92	1.00	1.00	.83	1.00	1.00	.92	1.00	12	.74
Nontr										
1-Wk	.94	.94	*.50	*.61	.94	.94	.94	.94	18	.69
Immed	1.00	.75	1.00	1.00	.83	.83	.83	.92	12	.74
Bal										
1-Wk	.78	.78	.89	.83	.83	.94	.72	.72	18	.69
Immed	.92	.83	1.00	1.00	1.00	1.00	.92	.75	12	.74

*Denotes proportions that are not greater than could be expected due to chance.

Again, with one minor exception, recall of relations in the transcendent scenario was consistently high.

For the nontranscendent scenario, recall in the immediate condition was also generally high. However, in the one-week condition, recall of the B-C and C-B relations was quite low. As in the "The Messy Divorce," subjects in the nontranscendent condition scored low on the relations that described a dislike sentiment between a father and daughter.

Finally, in the balanced condition, the proportions of correct responses were generally high, both immediately and after one week; this held even for the dislike sentiment between father and daughter (B-D, D-B).

DISCUSSION

Three important conclusions may be drawn from the preceding results. One has to do with the importance of unit relations in determining people's expectations about interpersonal relations; the second with the fact that subjects sought, and commonly found, transcendent explanations even when the context did not explicitly provide them; and the third with the general superiority in learning transcendent patterns over nontranscendent ones.

As to the significance of unit relations for expectations about sentiments, we saw repeatedly that when the negative sentiments were paired with parent-child unit relations, subjects processed the sentences longer and remembered the information less well. This strong tendency accounted for much of the disconfirmation of the a-priori hypothesis, as discussed below.

Secondly, it appears that even in the nontranscendent condition, subjects sought for an explanation for unbalanced patterns and found it in the divorce schema and the religious differences schema. This outcome also affected the a-priori hypothesis, as will be discussed below.

Even though the a-priori hypotheses were not fully confirmed, there was consistent evidence that transcendent patterns were acquired and retained better than nontranscendent ones. Thus, the sentiments in the transcendent condition took less time and were more accurately reproduced than were the sentiments in either of the other two conditions. This emphasizes the importance of transcendent explanations in the analysis of unbalanced patterns.

"The Messy Divorce." Analysis of acquisition times and of errors at recall suggest that subjects in all three conditions employed schemas that involved (a) the assumption of positive parent-child relations and (b) knowledge of

divorce as a transcendent explanation for unbalanced patterns of relations.

Consider, first, the parent-child relation. In retrospect, it is clear that this is a unit relation; hence, according to Heider (1958), both parent and child should feel positively toward each other. When that explanation is violated, therefore, one would expect the individual subjects to spend more time processing sentences that include that information and, subsequently, to remember the relation less well.

Such was the case. In the nontranscendent condition, for example, subjects spent a great deal of time studying sentences 6 and 7, which presented the negative relation between Susan and Laura and then said that they were mother and daughter. In spite of the longer reading times, subjects in the nontranscendent condition did not recall "Susan dislikes Laura" accurately (.44 and .67 for the one-week and immediate recall, respectively). "Laura dislikes Susan" was recalled slightly better than chance levels (.72 and .83).

A similar result was found for the parent-child relation in the balanced condition: subjects spent considerably more time studying sentences 10 and 11 in the balanced condition than in the transcendent condition. The balanced version presented a dislike sentiment between Tom and David (father and son), in contrast to the transcendent version's like sentiment between Ann and Robin (mother and daughter). Similarly, the proportion of correct responses for "father dislikes son" in the balanced condition was less than chance levels (.50 and .58) and was significantly lower than for the "son dislikes father" (.89 and 1.00). This parent-child relationship differs in two ways from the one in the nontranscendent version. First, the balanced version offers a causal explanation for the son disliking the father, "David blames his father

for breaking up the marriage." Second, the relationship in the balanced version is between father and son, rather than mother and daughter. Although the sentiments among the four persons in the balanced condition formed a balanced, two-clique structure, the combination of a negative sentiment with a unit relation (parent and child) in effect made the structure unbalanced. That is, the "balanced" condition was not actually balanced.

As evidence that subjects used divorce as a transcendent explanation, there is, first, the fact that few errors were made in the transcendent condition. Likewise, few errors were made on the questions in the nontranscendent and balanced versions that were consistent with what is implied in the transcendent explanation.

The concentration of errors made by subjects in the balanced condition suggests that those subjects relied on knowledge of the divorce situation and unit relationships to recall the sentiments. Of the 10 subjects who missed only 1 given relation, 7 missed B-D (father dislikes son); the other 3 subjects each missed different questions. That is, the errors on B-D were not random, but suggest that subjects relied, in recall, on their assumption of positive parent-child relations.

Subjects in the balanced and transcendent conditions also made inferences that were consistent with the divorce schema. In the balanced condition, of the 17 subjects who responded correctly to 7 or 8 given questions, 16 inferred dislike sentiments between Tom's ex-wife and his girlfriend. Also, 14 subjects inferred a dislike sentiment from David, Tom's son, to Tom's girlfriend (D-A), and 10 inferred a dislike sentiment from Tom's girlfriend to David (A-D).

In the transcendent condition, twenty-one of the twenty-two subjects

answered at least 7 given questions correctly: 19 of those subjects inferred a dislike sentiment from C to A (Ann's ex-husband and boyfriend), and 15 subjects inferred a dislike sentiment from A to C. In contrast, all 21 subjects inferred a <u>like</u> sentiment from Ann's boyfriend to her daughter, Robin (A-D), and 19 subjects inferred a <u>like</u> sentiment from Robin to Ann's boyfriend (D-A). The divorce context implies dislike sentiments between a former spouse and a current romantic interest; however, it is equivocal for like or dislike sentiments between the child and romantic interest. Note that most of the transcendent and balanced subjects inferred dislike sentiments between C and A. The inferences between A and D, however, were not as consistent.

The acquisition times, the errors on recall, and the inferences in recall suggest that subjects in all three schema conditions used knowledge of the divorce situation as a transcendent explanation for processing and recalling the sentiments.

<u>2. "Religious Differences."</u> The results of the acquisition and correct response measures were similar to those of "The Messy Divorce." The sentences in the nontranscendent and balanced stories that were inconsistent with unit relations implied by the scenario were studied longer.

In the nontranscendent scenario, sentences 6 and 7 described a dislike sentiment between father (B) and daughter (C): "Frank and his daughter, Lana, do not like each other. Frank does not approve of Lana's religious beliefs." Subjects in the one-week time of recall condition did not remember those relations at above chance level (B-C, .50; C-B, .61). This contrasts sharply with the immediate recall condition, in which <u>all</u> subjects remembered both relations accurately.

In the balanced version, sentences 10 and 11 described the same

relationship, and were studied significantly longer than the same sentences in the transcendent version. "Kathy and her father, Ted, dislike each other. They frequently argue heatedly about Kathy's marriage to Steve." In the one-week recall balanced condition, subjects remembered the relations moderately well (D-B .72; B-D .72); these proportions were just above the .69 required to exceed random levels. Subjects in the immediate recall interval condition also responded correctly at above chance levels (D-B, .92; B-D, .75).

As in "The Messy Divorce," subjects in the balanced condition who missed only one given relation predominantly missed the parent dislikes child sentiment (B-D). For those 9 subjects, 5 missed this relation, 2 missed D-B, and one each missed B-C and C-D.

The acquisition and recall measures for "The Messy Divorce" and "Religious Differences" imply that subjects relied on knowledge of common experiences suggested by the information in the first three sentences to process the sentiments. This is evident because (1) the reading times for sentiments that were incongruent with the unit relations implied by the context are longer than are reading times for the expected sentiments, (2) the errors made by subjects are significantly greater for those sentiments that violated the strong unit relation implied in the parent-child relationship.

Acquisition and Recall of Schema-Consistent and Schema-Discrepant Information.

As noted previously, all of the sentiments that subjects found difficult to recall were dislike sentiments between parent and child. Evidently, subjects find it difficult to reconcile a violation of this strong unit relation. This was particularly true for the "parent dislikes child" sentiment. In addition, other factors may have influenced the recall of the

sentiments.

Many researchers have examined the differences in acquisition and recall between schema-consistent and schema-discrepant information. This research parallels the expected and unexpected sentiments in the balanced and nontranscendent scenarios for the present study. The results have not been clear-cut: some researchers have found that schema-consistent information is remembered better (Rothbart, Evans and Fulero, 1979; Cohen, 1981; Berman, Read, & Kenny, 1983). Others have found that schema-discrepant information is remembered better (Belmore, 1987; Belmore & Hubbard, 1987; Hastie, 1980; Hastie & Kumar, 1979; O'Sullivan and Durso, 1984; Srull, 1981).

Various explanations have been offered for these conflicting findings, including the complexity of the input information (Cohen, 1981); the observational goals (Cohen, 1981; Hastie, 1980); set-size effect (Hastie & Kumar, 1979); causal attributions (Crocker, Hannah & Weber, 1983); prior expectations, (Berman, Read & Kenny, 1983); centrality of trait to schema (O'Sullivan & Durso, 1984); individual vs. group traits (Stern, Marrs, Millar, & Cole, 1984); the recall instructions (Cohen, 1981); and depth of processing (Craik and Lockhart, 1972), (Craik and Tulving, 1975), (Hashtroudi, Mutter, Cole & Green, 1984). Craik and Tulving (1975) suggest that subjects will best recall information that is stored as a coherent, integrated structure. Factors affecting whether or not information is stored in such a structure include the depth of processing required, its centrality to a schema, and the causal explanation accompanying the information.

1. Depth of processing. Researchers who find superior recall for schema-discrepant information attribute these results to greater attention and increased cognitive activity given to incongruent information (Crocker, et al.

1983; Hastie, 1981; Hastie and Kumar, 1979; Srull, 1981; Wyer, Bodenhausen, & Srull, 1984). However, in the present experiment some of the incongruent relationships that were studied longer were recalled accurately and some were not, so amount of attention alone cannot account for recall.

Others have argued that the amount of time taken for processing tasks is not a good indicator of depth of processing or elaboration (Craik and Lockhart, 1972; Craik and Tulving, 1975; Hashtroudi, et al. 1984). Craik and Lockhart's depth of processing model specifies that processing on a deeper level implies a greater degree of semantic or cognitive analysis. They argue that subjects process highly familiar information that is compatible with existing cognitive structures at a deeper level more rapidly and retain it better than novel information. For the present study, this explains the shorter processing time and more accurate results for the expected sentiments. The unexpected sentiments, which should require processing at the same deep level, require more effort and hence more time to process.

Craik and Tulving (1975) found that subjects recalled information processed at a deeper level (semantic tasks) better than information processed at a shallow level (phonetic or rhyming tasks) regardless of the processing time required by the task. Moreover, they found that the integrated, coherent pattern produced by the processing task aided recall even more than the depth of processing. Thus, information that is easily integrated into a coherent pattern should be recalled accurately. This includes information that is (1) consistent with a schema, or (2) accounted for with a causal explanation.

2. Centrality of schema-discrepant information. The centrality of information to a schema may affect processing time and recall by affecting a subject's motivation to account for the inconsistency. O'Sullivan and Durso

(1984) varied the centrality of a behavior to a schema (trait) and the congruency of the behavior. They found an interaction between core and peripheral items: subjects recalled core incongruent items better than core congruent items, but did not recall peripheral incongruent items better than peripheral congruent items.

The contrast between core and peripheral items may account for some of the findings in the present study. Two unexpected sentiments were recalled significantly greater than chance: (1) the like sentiment between a woman and her ex-husband in the nontranscendent version of "The Messy Divorce," and (2) the like sentiment between a man and his son-in-law in the nontranscendent version of "Religious Differences." Each of these relationships was central to the conflict described in the situation. That is, for "The Messy Divorce," the relationship between the divorced couple is the one on which the conflict depends. For "Religious Differences," the father's attitude about inter-faith marriage is the source of conflict--hence the relationship between this man and his son-in-law and daughter are central to the situation.

When unexpected sentiments occur on central relationships, subjects should be motivated to find a causal explanation, and so should process the information more deeply. This accounts for the high response rates on the two unexpected relations mentioned in the previous paragraph, each of which had long acquisition times. However, it does not account for the low scores (B-C, .50; C-B, .61) on recall of the father-daughter sentiment by subjects in the one-week condition in the nontranscendent condition of "Religious Differences."

3. Causal attributions. Causal attributions provided by the scenarios for the unexpected parent-child relationships may also have influenced which

sentiments were recalled well and which were not.

For "Religious Differences," sentences 6 and 7 in the nontranscendent version are: "Frank and his daughter, Lana, do not like each other. Frank does not approve of Lana's religious beliefs." The second sentence offers a weak causal explanation for the dislike sentiments. In contrast, the balanced version sentences 10 and 11 are: "Kathy and her father, Ted, dislike each other. They frequently argue heatedly about Kathy's marriage to Steve." The second sentence offers a stronger causal explanation for the sentiments. Recall that for the nontranscendent parent-child sentiments, <u>all</u> of the subjects who were in the immediate recall condition answered both B-C and C-B questions correctly. Subjects in the one-week recall condition, however, answered significantly fewer questions correctly (.50 and .61). Subjects in the balanced condition, who were given the stronger causal explanation, recalled both the father-daughter and the daughter-father questions greater than chance (for D-B, one-week = .72, immediate = .92; for B-D, one-week = .72, immediate = .75). Perhaps the weaker causal statement in the nontranscendent version induced subjects to form a weak causal association which was not strong enough to persist after the one-week delay, while the stronger causal explanation in the balanced version provided a better link between the sentiments and the people, which persisted over the one-week retention interval.

The possibility that deep processing produced a coherent, integrated structure is offered as a tentative account for the recall results. This integrated structure may consist of both schema-consistent and schema-discrepant sentiments, although schema-discrepant sentiments should be accounted for with causal explanations. Still unexplained are (1) the

significant interaction with time of recall in "Religious Differences," but not for "The Messy Divorce," and (2) the two expected relations in the transcendent ("Religious Differences") and balanced versions ("The Messy Divorce") that were poorly recalled.

SUMMARY

Although the varying effects of the three conditions of the context variable produced significant interactions, therefore not supporting the a-priori hypothesis, the notion of a transcendent explanation was strongly supported. In addition, results demonstrated that information that cannot be accounted for within a schema may not be recalled accurately, even when it receives greater processing time. These results are best accounted for with Craik and Tulving's notion of an integrated, coherent pattern produced by deep processing.

Bibliography

Abelson, R. P. (1959). Modes of resolution of belief dilemmas. Journal of Conflict Resolution, 3, 343-352.

Belmore, S. (1987). Determinants of attention during impression formation. Journal of Experimental Psychology: Learning, Memory, and Cognition, 13, 480-489.

Belmore, S., Hubbard, M. L. (1987). The role of advance expectancies in person memory. Journal of Personality and Social Psychology, 53, 61-70.

Berman, J. S., Read, S. J., & Kenny, D. A. (1983). Processing inconsistent social information. Journal of Personality and Social Psychology, 45, 1211-1224.

Bransford, J. D., and & Johnson, M. K. (1972). Contextual prerequisites for understanding: Some investigations of comprehension and recall. Journal of Verbal Learning and Verbal Behavior, 11, 717-726.

Cartwright, D. & Harary F. (1956). Structural balance: A generalization of Heider's theory. Psychological Review, 63, 277-293.

Cohen, C. (1987). Person categories and social perception: Testing some boundaries of the processing effects of prior knowledge. Journal of Personality and Social Psychology, 40, 441-452.

Craik, F. I. M. & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. Journal of Verbal Learning and Verbal Behavior, 11, 671-684.

Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. Journal of Experimental Psychology: General, 104, 268-294.

Crocker, J., Hannah, D. B, & Weber, R. (1983). Person memory and causal attributions. Journal of Personality and Social Psychology, 44, 55-66.

Crockett, W. H. (1979). Inferential rules in the learning and recall of patterns of sentiments. Journal of Personality, 47, 658-676.

Crockett, W. H. (1982). Balance, agreement and positivity in the cognition of small social structures. in L. Berkowitz (Ed.) Advances in Experimental Social Psychology, Vol. 15. New York: Academic Press (1982), pp. 2-57.

Crockett, W. H. (1985). Age and the use of social schemas to process interpersonal information. In Cognition and Aging (pp. 171-206) (Grant Application #513-09-4336 to National Institute on Aging), Lawrence, KS: The University of Kansas Gerontology Center.

Crockett, W. H. & Kemper S. (1983). Balance and Linear Order as Social Schemas. A proposal submitted to the National Institute of Mental Health, Lawrence, KS: The University of Kansas.

Delia, J. G. & Crockett, W. H. (1973). Social schemas, cognitive complexity, and the learning of social structures. Journal of Personality, 41, 413-429.

DeSoto, C. B. (1960). Learning a social structure. Journal of Abnormal and Social Psychology, 60, 417-421.

Glasnapp, P.M. (1988) The Processing of Unexpected Social Structures: The Effect of Transcendent Explanations on Unbalanced Sentiment Structures. Unpublished doctoral dissertation. The University of Kansas, Lawrence.

Hashtroudi, S., Mutter, S. A., Cole, E. A., & Green, S. K. (1984). Schema-consistent and schema-inconsistent information: Processing demands. Personality and Social Psychology Bulletin, 10, 269-278.

Hastie, R. (1980). Memory for behavioral information that confirms or contradicts a personality impression. In R. Hastie, T. M. Ostrom, E. B. Ebbesen, R. S. Wyer, D. L. Hamilton, & D. E. Carlston (Eds.), Person memory: The cognitive basis of social perception. Hillsdale, N.J.: Erlbaum.

Hastie, R. (1981). Schematic principles in human memory. In E. T. Higgins, C. P. Herman, & M. P. Zanna (Eds.), Social Cognition: The Ontario Symposium, (Vol 1). Hillsdale, N.J.: Erlbaum, 1980.

Hastie, R., & Kumar, P. A. (1979). Person memory: Personality traits as organizing principles in memory for behaviors. Journal of Personality and Social Psychology, 37, 25-38.

Heider, F. (1958). The Psychology of Interpersonal Relations, New York: John Wiley and Sons, Inc.

Hummert, M. L. (1986). Processing Mechanism Underlying the Use of the Balance Schema. Unpublished doctoral dissertation, The University of Kansas, Lawrence.

O'Sullivan, C. S., & Durso, F. T. (1984). Effect of schema-incongruent information on memory for stereotypical attributes. Journal of Personality and Social Psychology, 47, 55-70.

Picek, J. S., Sherman, S. J. & Shiffrin, R. M. (1975). Cognitive organization and coding of social structures. Journal of Personality and Social Psychology, 31, 758-768.

Press, A. N., Crockett, W. H. & Rosenkrantz, P. S. (1969). Cognitive complexity and the learning of balanced and unbalanced social structures. Journal of Personality, 37, 541-553.

Rothbart, M., Evans, M., & Fulero, S. (1979). Recall for confirming events: Memory processes and the maintenance of social stereotypes. Journal of Experimental Social Psychology, 15, 343-355.

Sentis, K. P., & Burnstein, E. (1979). Remembering schema-consistent information: Effects of a balance schema on recognition memory. Journal of Personality and Social Psychology, 37, 2200-2211.

Srull, T. K. (1981). Person memory: Some tests of associative storage and retrieval models. Journal of Experimental Psychology: Human Learning and Memory, 7, 440-463.

Stern, L. D., Marrs, S., Millar, M. G. & Cole, E. (1984). Processing time and the recall of inconsistent and consistent behaviors of individuals and groups. Journal of Personality and Social Psychology, 47, 253-262.

Wyer, R. S., Bodenhausen, G. V., & Srull, T. K. (1984). The cognitive representation of persons and groups and its effect on recall and recognition memory. Journal of Experimental Social Psychology, 20, 445-469.

APPENDIX

STORIES

"The Messy Divorce"

Transcendent:

1. The title of this story is "The Messy Divorce."
2. This story describes the relationships among a woman, Ann, her boyfriend, Hal, her ex-husband, Mike, and her daughter, Robin.
3. The divorce between Ann and Mike produced many bitter feelings between them, although their daughter, Robin, has maintained a positive relationship with both her parents.
4. Hal and Ann are very fond of each other.
5. They have been seeing each other for six months.
6. Mike and Ann have an intense dislike for each other.
7. They were divorced after 20 years of marriage.
8. Robin and Mike get along very well together.
9. They have been close since Robin was small.
10. Robin and Ann like each other very much.
11. They spend a lot of their leisure time together.

Nontranscendent:

1. The title of this story is "The Messy Divorce."
2. This story describes the relationships among a woman, Susan, her boyfriend, Paul, her daughter, Laura, and her ex-husband, Alan.
3. The divorce between Susan and Alan produced many hardships in the family; such broken marriages have become increasingly common in modern American society.
4. Susan and Paul are very fond of each other.
5. They have been seeing each other for six months.
6. Susan and Laura have an intense dislike for each other.
7. Laura is Susan's daughter from her first marriage.
8. Alan and Laura get along together very well.
9. They have been close since Laura was small.
10. Alan and Susan like each other very much.
11. They have maintained a close relationship through the years.

Balanced:

1. The title of this story is "The Messy Divorce."

2. This story describes the relationships among a man, Tom, and his girlfriend, Becky, his ex-wife, Mary, and his son, David.
3. The divorce between Tom and Mary produced bitter feelings between them; their son, David, maintains close ties with his mother, but resents his father.
4. Tom and Becky are very fond of each other.
5. They have been seeing each other for six months.
6. Mary and Tom have an intense dislike for each other.
7. They were divorced after 10 years of marriage.
8. David and Mary get along very well together.
9. They have been close since David was small.
10. David and Tom do not like each other.
11. David blames his father for breaking up the marriage.

"Religious Differences"

Transcendent:

1. This title of this story is "Religious Differences."
2. This story describes the relationships among a man, Ben, and his wife, Sue, his daughter Debbie, and his son-in-law, Kevin.
3. Ben is a devout follower of a religion that doesn't permit interfaith marriages; he is unhappy that his daughter married someone of another faith.
4. Ben and Sue are close and rarely disagree about anything.
5. They married five years ago, after Ben's first wife died.
6. Ben and his son-in-law, Kevin, do not like each other.
7. Ben and Kevin frequently argue about religious beliefs.
8. Kevin and Debbie care for each other very much.
9. They eloped several years ago despite background differences.
10. Debbie and her father, Ben, get along well.
11. Debbie and Ben have always had a close relationship.

Nontranscendent:

1. The title of this story is "Religious Differences."
2. This story describes the relationships among a man, Frank, and his wife, Judy, his daughter, Lana, and his son-in-law, Peter.
3. Frank is a devout member of a religion that doesn't permit interfaith marriages; many of the major religions in the world still discourage this.
4. Judy and Frank are close and rarely disagree about anything.
5. They married five years ago, after Frank's first wife died.
6. Frank and his daughter, Lana, do not like each other.
7. Frank does not approve of Lana's religious beliefs.
8. Lana and Peter care for each other very much.
9. They eloped several years ago despite background differences.
10. Peter and his father-in-law, Frank, get along well.
11. They occasionally enjoy playing in golf tournaments on weekends.

Balanced:

1. The title of this story is "Religious Differences."
2. This story describes the relationships among a man, Ted, and his wife, Helen, his daughter, Kathy, and his son-in-law, Steve.
3. Ted is a devout follower of a religion that doesn't permit interfaith marriages; he is unhappy that his daughter, Kathy, has married into another faith.
4. Helen and Ted are close and rarely disagree about anything.
5. They married five years ago, after Ted's first wife died.
6. Ted and his son-in-law, Steve, do not like each other.
7. Ted does not approve of Steve's religious beliefs.
8. Steve and Kathy care for each other very much.
9. They eloped several years ago despite background differences.
10. Kathy and her father, Ted, dislike each other.
11. They frequently argue heatedly about Kathy's marriage to Steve.

"The Student Senate"

Transcendent:

1. The title of this story is "The Student Senate."
2. This story describes four students, Matt, Jeff, Chris, and Ryan, who have worked together in student government for several years.
3. Jeff and Chris are frequently rivals for positions and clash on most issues; however, each of them gets along well with the other two students.
4. Matt and Jeff like each other very much.
5. They have always worked well together on projects.
6. Jeff and Chris do not like each other.
7. Neither can tolerate the other's opinion or personality.
8. Chris and Ryan have been friends for years.
9. They almost always support each other on issues.
10. Ryan and Jeff always get along together well.
11. They successfully co-chaired the publicity for homecoming last year.

Nontranscendent:

1. The title of this story is "The Student Senate."
2. This story describes four students, Randy, Bill, Carl, and Jim, who have worked together in student government for several years.
3. These students pride themselves on what they've accomplished for the school; the relations between the student body and the administration have never been so good.
4. Randy and Bill like each other very much.
5. They frequently spend leisure time together on weekends.
6. Bill and Carl do not like each other.
7. They occasionally work together on publicity for special events.
8. Carl and Jim have been friends for years.
9. They both attended a small high school nearby.
10. Jim and Bill always get along together well.

11. They both actively participate in winter team sports.

Balanced:

1. The title of this story is "The Student Senate."
2. This story describes four students, Jerry, Scott, Chuck, and Mark, who have worked together in student government for several years.
3. Two of the students are very competitive and frequently argue on procedural matters; this personality clash has caused friction among others in the organization also.
4. Jerry and Scott like each other very much.
5. They have always worked well together on projects.
6. Scott and Chuck do not like each other.
7. Neither can tolerate the other's opinion or personality.
8. Chuck and Mark have been friends for years.
9. They side together on issues most of the time.
10. Mark and Scott do not get along well.
11. They disagreed sharply on allocation of funds last year.

Practice Story

1. The title of this story is "The Class Project."
2. This story describes four students, Alex, Ray, Sam, and Jason, who are students in the same communication class.
3. These students have been assigned to work together on a group project for the class; this assignment is important to their final class grades.
4. Alex and Ray like each other very much.
5. They have taken many of their class together.
6. Sam has tried unsuccessfully to be friends with Ray.
7. Ray thinks that Sam is an obnoxious jerk.
8. Jason cannot tolerate Sam's mannerisms and nervous chatter.
9. Sam tries to impress Jason by telling off-color jokes.
10. Jason and Alex have been friends for a year.
11. They live on the same floor in the dormitory.

Table 5

"The Student Senate"

Initial Reading Times*

Schema	Sentence				M
	4	6	8	10	
Trans	8.62	8.63	8.50	8.41	8.54
Non	8.40	8.60	8.60	8.58	8.55
Bal	8.60	8.55	8.64	8.57	8.59

*Log_n of reading times in milliseconds.

Table 6

"The Student Senate"
Proportion of Correct Responses

Schema	Questions on Given Relations								n	p(.05
	A-B	B-A	B-C	C-B	C-D	D-C	D-B	B-D		
Trans										
1-Wk	.90	.80	*.40	*.50	*.70	1.00	*.60	*.70	10	.76
Immed	1.00	1.00	*.67	.92	.92	1.00	.83	1.00	12	.74
Nontr										
1-Wk	.94	.89	.78	*.50	*.61	*.67	.83	.89	18	.69
Immed	.83	1.00	*.58	*.58	.75	.75	.83	*.67	12	.74
Bal										
1-Wk	.78	*.56	*.67	.72	.89	*.61	*.61	.78	18	.69
Immed	.92	.75	*.67	*.58	.83	*.67	.75	.75	12	.74

*Denotes proportions that are not greater than could be expected due to chance.

Table 7

Results of MANOVA on Effects of Schema, Context and Sentence on Initial Reading Time: Log_n Transformed Scores

Between-Subjects Effects:

Effect	SS	DF	MS	F	Signif of F
Within cells	67.78	79	.86		
Schema	2.91	2	1.46	1.70	.19

Within-Subjects Effects:

Effect	Pillais	Approx. F	Hypoth. DF	Error DF	Signif of F
Schema X Context X Sentence	.27	1.94	12	150	.033
Context X Sentence	.30	5.22	6	74	.0005
Schema X Sentence	.26	3.92	6	156	.001
Schema X Context	.07	1.40	4	158	.237
Context	.42	24.74	2	78	.0005
Sentence	.09	2.69	3	77	.052

Table 8

"The Messy Divorce"

Results of MANOVA on Effects of Schema and Sentence on Initial Reading Time: Log_n Transformed Scores

Between-Subjects Effects:

Effect	SS	DF	MS	F	Signif of F
Within cells	21.71	79	0.27		
Schema	2.37	2	1.18	4.30	.017

Within-Subjects Effects:

Effect	Pillais	F	Hypoth. DF	Error DF	Signif of F
Schema X Sentence	.32	5.02	6	156	.0005
Sentence	.12	3.38	3	77	.023

Table 9

"Religious Differences"

Results of MANOVA on Effects of Schema and Sentence on Initial Reading Time: Log_n Transformed Scores

Between-Subjects Effects:					
Effect	SS	DF	MS	F	Signif of F
Within cells	21.57	79	0.27		
Schema	2.13	2	1.07	3.91	.024

Within-Subjects Effects:					
Effect	Pillais	F	Hypoth. DF	Error DF	Signif of F
Schema X Sentence	.23	3.34	6	156	.004
Sentence	.27	9.66	3	77	.0005

Table 10

"The Student Senate"

Results of MANOVA on Effects of Schema and Sentence on Initial Reading Time: Log_n Transformed Scores

Between-Subjects Effects:					
Effect	SS	DF	MS	F	Signif of F
Within cells	66.36	79	0.84		
Schema	.17	2	.08	.10	.905

Within-Subjects Effects:					
Effect	Pillais	F	Hypoth. DF	Error DF	Signif of F
Schema X Sentence	.07	.94	6	156	.470
Sentence	.02	.47	3	77	.702

Table 11

Results from MANOVA on Effects of Recall Interval, Schema, and Context on Correct Responses to Given Questions

Between-Subjects Effects:

Effect	SS	DF	MS	F	Signif of F
Within Cells	207.94	76	2.74		
Schema X Recall	2.38	2	1.19	.43	.649
Schema	14.23	2	7.11	2.60	.081
Recall	21.87	1	21.87	7.99	.006

Within-Subjects Effects:

Effect	Pillais	F	Hypoth. DF	Error DF	Signif of F
Schema X Recall X Context	.07	1.43	4	152	.226
Recall X Context	.0002	.01	2	75	.992
Schema X Context	.01	.15	4	152	.961
Context	.26	13.01	2	75	.0005

Table 12

"The Messy Divorce"

Results from MANOVA on Effects of
Schema and Recall on Correct Responses
to Given Questions

Between-Subjects Effects:

Effect	SS	DF	MS	F	Signif of F
Within Cells	19.08	76	.25		
Schema X Recall	.26	2	.13	.53	.593
Schema	.72	2	.36	1.43	.246
Recall	.88	1	.88	3.50	.065

Within-Subjects Effects:

Effect	Pillais	F	Hypoth. DF	Error DF	Signif of F
Schema X Recall X Question	.09	.47	14	142	.944
Recall X Question	.04	.37	7	70	.918
Schema X Question	.42	2.69	14	142	.002
Question	.26	3.59	7	70	.002

Table 13

"Religious Differences"

Results from MANOVA on Effects of Schema and Recall on Correct Responses to Given Questions

Between-Subjects Effects:

Effect	SS	DF	MS	F	Signif of F
Within Cells	12.56	76	.17		
Schema X Recall	.14	2	.07	.43	.651
Schema	.43	2	.22	1.31	.275
Recall	.85	1	.85	5.15	.026

Within-Subjects Effects:

Effect	Pillais	F	Hypoth. DF	Error DF	Signif of F
Schema X Recall X Question	.29	1.71	14	142	.059
Recall X Question	.14	1.67	7	70	.13
Schema X Question	.27	1.56	14	142	.095
Question	.13	1.43	7	70	.207

Table 14

"The Student Senate"

Results from MANOVA on Effects of
Schema and Recall on Correct Responses
to Given Questions

Between-Subjects Effects:

Effect	SS	DF	MS	F	Signif of F
Within Cells	23.50	76	.31		
Schema X Recall	1.40	2	.70	2.27	.111
Schema	.77	2	.38	1.24	.295
Recall	1.01	1	1.01	3.26	.075

Within-Subjects Effects:

Effect	Pillais	F	Hypoth. DF	Error DF	Signif of F
Schema X Recall X Question	.13	.71	14	142	.763
Recall X Question	.05	.55	7	70	.791
Schema X Question	.33	1.97	14	142	.024
Question	.27	3.70	7	70	.002